Disclaimer:
These parts are intended for race use only, and due to the unpredictable nature and high stresses of a racing environment there is no warranty, expressed or implied. The parts are not certified for use on public roads, and as such may not be legal for highway use. Wilhelm Race Works LLC is not liable for any damage directly or indirectly related to the use or mis-use of these components.

A note on rod ends:
This kit replaces several OEM components with rod end spherical bearings. Please be aware that these are wear items, and depending on the conditions of their use may have a shorter lifespan than the OEM components that they replace. They must be inspected periodically for wear or looseness and replaced if necessary. The rod ends included in the kit are all made by QA1, and their part numbers are EXML8-10 (LH thread) and EXMR8-10 (RH thread) on the rear tie rod, and PCYMR10T on the front tie rod. Replacements, if needed, can be purchased directly from QA1, from any number of other vendors, or through Wilhelm Race Works, LLC. If you wish to substitute alternate rod ends please contact me for suitable alternatives.

Parts list:

Front:
2x 1.75" thick front roll center adjusters (RCA)
2x Tapered tie rod studs
2x Aluminum tie rod spacers
2x Tie rod end assemblies
2x .300" bump steer spacers
2x 5/8-18 nylock nuts
2x 7/16-20 nylock nuts
2x 7/16 lock washers
4x M10x1.25x70mm bolts

Rear:
2x 1.25" thick rear RCA
2x Welded steel rear tie rod brackets
2x Rear tie rod press in steel "slugs"
2x Rear tie rod assemblies
4x Rod end spacers (for tie rod to chassis)
4x 1/2" washers (for tie rod to chassis)
2x Brass bushings (pre-installed in tie rod inboard end)
2x 1/2-20x2" bolts
2x 1/2-20x3" bolts
4x 1/2-20 nylock nuts
4x M12x1.25x65mm bolts
2x M12x1.25x80mm bolts (for rear tie rod to chassis)

NOTE: The hardware is bagged in groups according to it's application. Taking note of what parts are bagged together will help determine what parts are installed together.

Installation Instructions:

A Toyota Factory Service Manual may be helpful to have on hand to reference during the installation process.

NOTE: Where possible the rod ends have been pre-installed to the tie rods / tie rod adapters with a light coat of anti-seize. If disassembled for rod end replacement I recommend re-applying anti-seize to facilitate future adjustment or replacements.

Front:

1. Set the parking brake and chock the rear wheels. Jack up the front of the car and support securely with jack stands. Remove the front wheels.
2. Remove the two bolts holding the ball joint to the knuckle. Install the thicker (1.75") front Roll Center Adjuster (RCA) between the ball joint and the knuckle and secure using the 10mm bolts. Torque to the OEM specification of 59 ft-lb.
3. Break loose - but do not move - the jam nut holding the outer tie rod end to the inner tie rod. Remove the cotter pin and nut from the top of the outer tie rod, and remove the outer tie rod end. A 2 jaw puller or pickle fork may be required.
4. Install the new outer tie rod end to the inner tie rod. The outer tie rods have been designed such that if the jam nut is not moved your wheel alignment should not change significantly. An alignment will still be needed after installation, but it should be close enough to get you to the alignment shop. Torque the jam nut.
5. Install front tie rod stud to the knuckle and secure using the 7/16" lock washer and small Nylock nut. Torque the top nut to 30 ft-lb. You may need to temporarily install the large lower nut to provide a means to hold the stud while installing the top nut.
6. Install large spacer, small spacer (.3"), tie rod end, and large Nylock nut to the tie rod stud as shown in Figure 1. Torque the bottom nut to 60ft-lb. The included combination of spacers should minimize bump steer on most vehicles. However, variations in alignment, wheel offset, ride height, etc. may necessitate a slight change in shim thickness. If you feel the need to make adjustments, bump steer spacers are available in a variety of thicknesses from many online retailers. Small changes, 1/16" or less, can make a big difference, so adjust accordingly.

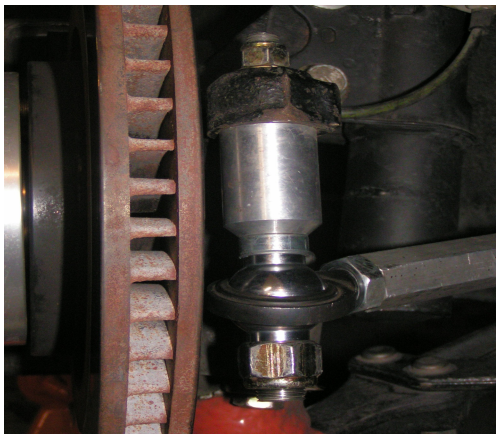

Figure 1: Front Tie Rod Installation

7. Reinstall the front wheels and torque to 75 ft-lb.

Rear:

1. Chock the front wheels. Jack up the rear of the car and support securely with jack stands. Remove the rear wheels.
   NOTE: You may be able to accomplish steps 2-4 without removing the knuckle by the use of a 3 jaw puller or ball joint press.
2. Remove the rear knuckle: First, remove the cotter pin and axle nut. Next, remove the two bolts holding the brake caliper and support the caliper with a zip tie or otherwise so as not to put excessive stress on the brake line. Remove the brake rotor. Loosen the two bolts holding the knuckle to the strut, loosen the two bolts holding the ball joint to the knuckle, and remove the two bolts holding the rear tie rod. Remove the knuckle.
3. Using a press, remove the tie rod spherical bearing from the rear knuckle. If you ever plan to put the stock parts back on it is best to devise some way to press on the bearing outer race only to avoid damage to the bearing.
4. Press in the steel slug to replace the bearing. Install the rear tie rod drop brackets over the steel slug. This may be a tight fit. You may need to use a block of wood and a hammer to tap the brackets onto the knuckle. Install the shorter of the two ½" bolt with one of the ½" Nylock nuts, and tighten until snug.
5. Match the alignment tabs on the bracket to the casting line on the top of the knuckle, as shown in Figures 1 & 2. 91/92 rear suspension users should install the brackets angled in toward the center of the car. 93+ users should install the brackets vertically, using the top alignment mark.

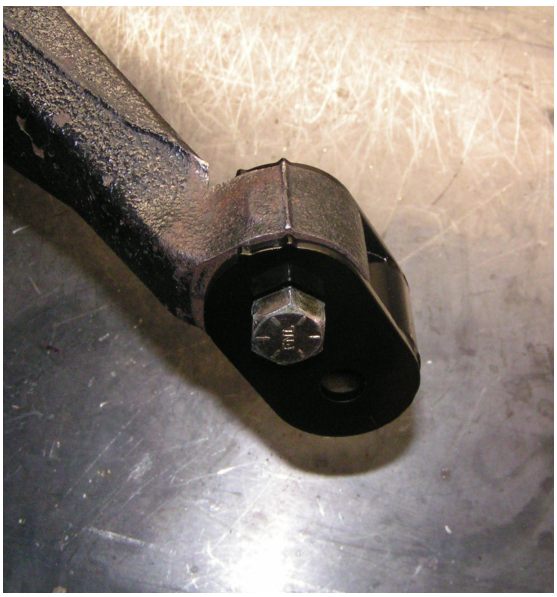

Figure 2: 91 Bracket Install

Figure 3: 93+ Bracket Install

6. Torque the ½" bolt attaching the bracket to the knubkle to 80 ft-lb. Adding a bead of black RTV to the joint between the knuckle and the bracket will help keep water from collecting in the bottom of the bracket.
7. Reinstall the knuckle (if you removed it earlier). It may be easier to torque all of the bolts at the end of this procedure once everything is attached. Install the rear

RCA between the knuckle and the rear ball joint and secure with the four 12mm bolts.

8. Install the rear tie rod as shown in Figure 4. Ensure that the end with the thin brass bushing is on the chassis end. Install with the two 1/2" washer, two spacers, and the included 12x80mm bolts. Torque to the OEM spec of 76 ft-lb.

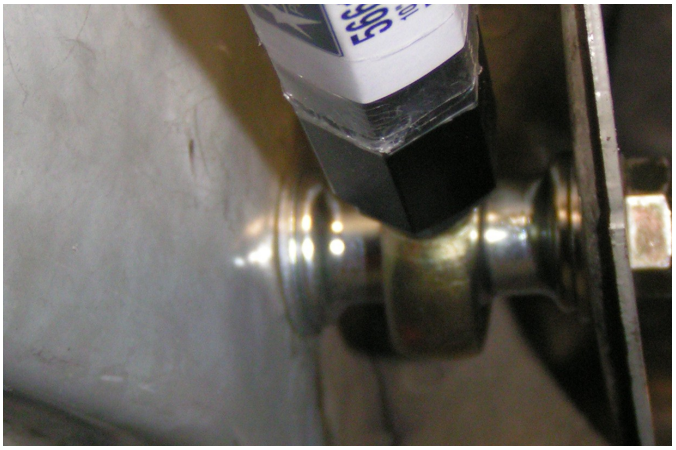

Figure 4: Rear Tie Rod Installation

9. Insert longer ½" bolt through the rod end and tie rod bracket and secure with one of the ½" Nylock nuts on the forward side. Torque to 40 ft-lb.
   Note: The left hand threaded end of the rear tie rods are marked with notches on both the tie rod and the jam nut.
   Note: The jam nuts on the rear tie rods have NOT been tightened. The tie rods must be adjusted to approximately the right length (to set rear toe) and tightened before driving the car.
10. Torque all remaining bolts to OEM specs:
    Ball joint to knuckle bolts: 83 ft-lb.
    Brake caliper bolts: 43 ft-lb.
    Knuckle to strut bolts: 188 ft-lb.
    Axle nut: 137 ft-lb non-turbo axles, 217 ft-lb for turbo axles.
11. Reinstall the rear wheels and torque to 75 ft-lb, and lower the car.

Get a good alignment, and enjoy!

If you have any questions about the installation process please contact me on mr2oc.com, or via email at wilhelmraceworks@gmail.com, or give me a call at (406) 261-0111.

Once again, I thank you for your business.